

REMARKS

The Examiner rejected claim 16 under 35 U.S.C. 112 (2nd paragraph) stating “Claim 16 depends from canceled claim 1. Assuming claim 16 depends from claim 10 for the purposes of examination.” In response, Applicants have amended claim 16 to depend from claim 10.

The Examiner rejected claims 10-12 and 14-16 under 35 U.S.C. §102(b) as being unpatentable over US 5,880, 524 to Xie.

The Examiner rejected claims 13 and 17 under 35 U.S.C. 103(a) as being unpatentable over US 5,880, 524 to Xie in view of US 6,212,074 to Gonsalves et al.

Applicants respectfully traverse the §102(b) and §103(a) rejections with the following arguments.

35 USC § 102

As to claim 10, the Examiner states that “Regarding claim 10, Xie discloses a method in fig. 1A-5 for dissipating heat from an electronic package having one or more components comprising: providing a substrate 102, fig. 1A, column 2 line 47, having a first coefficient of thermal expansion; attaching a lid 104, column 2 line 56, to said substrate 102, said lid 104 including a vapor chamber 120, column 3 line 4, the lid 104 having a second coefficient of thermal expansion; matching said first coefficient of thermal expansion matched to said second coefficient of expansion; providing a thermal transfer medium 112, column 2 line 67, in contact with a back surface of each component 106, column 2 line 49, and an outer surface of a lower wall 132, column 2 line 61, of said lid 104; and electrically connecting each component to a top surface of said substrate 102, fig. 1A column 2 line 50.

Although the prior art does not specially disclose the limitations, i.e., ‘coefficient of thermal expansion’ and ‘matching said first coefficient of thermal expansion (CET) matched to said second coefficient of expansion’, this feature is seen to be inherently teaching of that limitations because each material would have possessed a CET, and that the matching CET would be the consequential results of the cooling action asserted by of the lid and the heat sink.”

Applicants contend that claim 10, as amended, is not anticipated by Xie because Xie does not teach each and every feature of claim 10. For example, Xie does not teach “said second coefficient of thermal expansion about equal to said first coefficient of thermal expansion.”

Applicants respectfully point out that Xie is silent as to coefficients of thermal expansion and does Xie does teach the coefficient of thermal expansion of substrate 102 and lid 104 being “about equal” as Applicants claim requires.

Based on the preceding arguments, Applicants respectfully maintain that claim 10 is not unpatentable over Xie and is in condition for allowance. Since claims 11-17, 21 and 22 depend from claim 10, Applicants respectfully maintain that claims 11-17, 21 and 22 are likewise in condition for allowance.

As to claim 11, the Examiner states that “ Xie discloses the method of claim 10, wherein said lower wall 132 of said lid 104 has a third coefficient of thermal expansion and said components 106 have a fourth coefficient of expansion and further including matching said third coefficient of expansion to said fourth coefficient of expansion, see discussion in claim 10.”

Applicants contend that claim 11, as amended, is not anticipated by Xie because Xie does not teach each and every feature of claim 11. For example, Xie does not teach “said second coefficient of thermal expansion different from said third coefficient of thermal expansion.”

Applicants point out that lower wall 132 of lid 104 is illustrated in FIG 1A of Xie as integral to lid 104 and thus can not have a different coefficient of thermal expansion as the rest of lid 104.

As to claim 12, the Examiner states “ Xie discloses the method of claim 10, further including: mounting a heat sink 140, column 3 line 35, having a fifth coefficient of thermal expansion to an outer surface 130, fig. 1A column 3 line 30, of a top wall of said lid, and matching said fifth coefficient of expansion to said second coefficient of expansion, see discussion in claim 10.”

Applicants contend that claim 12, as amended, is not anticipated by Xie because Xie does not teach each and every feature of claim 11. For example, Xie does not teach “mounting a heat sink having a third coefficient of thermal expansion to an outer surface of a top wall of said lid,

said third coefficient of thermal expansion between about 25% and about 700% of said second coefficient of thermal expansion.”

Applicants respectfully point out that Xie is silent as to coefficients of thermal expansion and does Xie does teach a coefficient of thermal expansion of heat sink 140 being “between about 25% and about 700%” of a coefficient of thermal expansion of external top surface 130 of lid 104.

35 USC § 103 Rejections

As to claim 13, the Examiner states that “Xie does not disclose the method of claim 10, wherein said lower wall of said lid said lid has protruding regions for maintaining equivalent contact with said thermal transfer medium on thin components of said components as is maintained by thin regions on thick components of said components” and “But Gonsalves discloses the method in fig. 1 wherein said lower wall 40 of said lid 30 has protruding regions (portion in contact with 10-1 – 10-10-7)”

Applicants contend that claim 13 is not obvious in view of Xie in view of Gonsalves et al. because Xie in view of Gonsalves et al. does not teach or suggest every feature of claim 13. For example, Xie in view of Gonsalves et al. does not teach or suggest “said lower wall of said lid has protruding regions.” Applicants respectfully point out that element 40 in Gonsalves et al. FIG, 1 is not part of lid 30 (actually a heat sink 30) as the Examiner contends, but rather is a separate element as taught in Gonsalves et al. col. 4, lines 25-32. “Preferably, the shape and area of the filling material 40 substantially coincides with the shape and area of the plurality of component faces 20-1 to 20-7. It will be appreciated that the choice of the resilient thermal-conductive filling material 40 enables an efficient thermal, as well as compliant, interface between the *planar* bottom portions 31 of the heat sink 30 and the plurality of faces 20-1 to 20-7. It is thus clear Gonsalves et al. teaches that the lower wall of the lid is *planar* and by definition, a planer surface can not have protruding regions and that is the filling material that has protruding regions.

Based on the preceding arguments, Applicants respectfully maintain that claim 13 is not unpatentable over Xie in view of Gonsalves et al. and is in condition for allowance

CONCLUSION

Based on the preceding arguments, Applicants respectfully believe that all pending claims and the entire application meet the acceptance criteria for allowance and therefore request favorable action. If Examiner believes that anything further would be helpful to place the application in better condition for allowance, Applicants invite the Examiner to contact the Applicants' representative at the telephone number listed below. The Director is hereby authorized to charge and/or credit Deposit Account 09-0457.

Respectfully submitted,
FOR:
Alcoe et al.

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Amendments to the Drawings:

The attached sheet of drawings includes changes to FIG. 6. This sheet replaces the original sheet including FIG. 6 in which elements 180 were labeled 185 and elements 185 were labeled 180. In the new FIG. 6, the swapped element labels have been corrected. No new matter has been added.

Attachment: Replacement Sheet

Related Patents

Applicants respectfully point out that this application is a divisional of Serial No. 10/198,393 filed on July 16, 2002 which has issued as U.S. 6,665,187 on December 16, 2003 and the original, amended and new claims listed above are process claims which include all of the limitations of product claims of U.S. 6,665, 187.